We Claim:

1. A thermal bend actuator which includes

a wafer substrate;

an elongate actuator arm that is fixed to the substrate at a fixed end, the elongate actuator arm including a heater layer of a conductive material and a dielectric, resiliently flexible layer, the heater layer defining a heater circuit which is connected to an electrical potential;

a working member that is fixed to an opposite free end of the actuator arm; and

control logic circuitry that is positioned on the substrate, between, and generally aligned with, the heater layer and the substrate, the control logic circuitry being interconnected between a data input means and the heater circuit and including register circuitry connected to the data input means to generate an enabling signal and firing circuitry connected between the register circuitry and the heater circuit to close the heater circuit on receipt of the enabling signal so that said electrical potential generates a current in the heater circuit, resistively to heat the heater layer, at least the heater layer being of a material having a coefficient of thermal expansion which is such that the heater layer can expand on heating and contract on cooling to do work, the heater layer being positioned so that the elongate actuator arm experiences differential thermal expansion and contraction and thus reciprocally displaces the working member.

2. A thermal bend actuator as claimed in claim 1, in which the control logic circuitry is configured so that traces defining the circuitry extend substantially at right angles with respect to a longitudinal axis of the actuator arm.

3. A thermal bend actuator as claimed in claim 2, in which the heater layer defines corrugations in regions that are aligned with the control circuitry, the corrugations extending substantially at right angles to the longitudinal axis of the actuator arm.

4. A thermal bend actuator as claimed in claim 1, in which the heater layer defines a transverse discontinuity such that a portion of the heater layer defines the heating circuit and is connected to the control logic circuitry and a remaining portion of the heater layer defines a structural supporting layer for the actuator arm.

5. A thermal bend actuator as claimed in claim 1, which includes a bend compensator layer that is positioned so that the dielectric layer is interposed between the heater layer and the bend compensator layer, the bend compensator layer being substantially identical to the heater layer.

6. A micro-electromechanical device that comprises

a substrate; and

a plurality of thermal bend actuators that are positioned on the substrate, each thermal bend actuator comprising

an elongate actuator arm that is fixed to the substrate at a fixed end, the elongate actuator arm including a heater layer of a conductive material and a dielectric, resiliently flexible layer, the heater layer defining a heater circuit which is connected to an electrical potential;

a working member that is fixed to an opposite free end of the actuator arm; and

control logic circuitry that is positioned on the substrate between, and generally aligned with, the heater layer and the substrate, the control logic circuitry being interconnected between a data input means and each heater circuit and including register circuitry connected to the data input means to generate an enabling signal and firing circuitry connected between the register circuitry and the heater circuit to close the heater circuit on receipt of the enabling signal so that said electrical potential generates a current in the heater circuit, resistively to heat the heater layer, at least the heater layer being of a material having a coefficient of thermal expansion which is such that the heater layer can expand on heating and contract on cooling to do work, the heater layer being positioned so that the elongate actuator arm experiences differential thermal expansion and contraction and thus reciprocally displaces the working member.